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multiCLASS[®]

Technology Migration Guide

APPLICATION NOTE

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Introduction

HID multiCLASS readers are designed for customers upgrading their current card system from the most popular proximity technologies to 13.56 MHz technology credentials. With multiCLASS, the customer has the ability to transition to smart cards while incorporating the use of multiple card technologies within a single building or across multiple facilities.

Prior to the transition process, consider the card formats for the proximity technology (outgoing) credentials and the 13.56 MHz technology credentials (incoming). This affects efforts supporting the two card technologies by the access control system and depends on the proximity technology and 13.56 MHz technology utilized. This guide highlights areas for consideration and provides best practice solutions. For further assistance, contact HID Technical Support.

multiCLASS

multiCLASS readers provide iCLASS migration from HID Prox, Indala Prox, AWID and EM4102 125 kHz proximity technologies. Each has different migrations to the output data from the reader when presenting an iCLASS or Prox technology card.

HID Prox

iCLASS was developed around the existing HID 125 kHz technology and because the readers treat card formats similarly, the migration between the two technologies is relatively straightforward.

The easiest method for transitioning is to match the incoming iCLASS format with the outgoing HID Prox format. Choose to match the card numbers for the new card population or a new range to distinguish the new cards.

It may be desirable to choose a new format for the incoming iCLASS credentials. For instance If the outgoing cards are using the popular 26-bit open Format (H10301) you may want to migrate the new cards to a format that provides less chance of duplication, for example:

- H10304 – 37-bit Tracked format with customer defined facility code
- H10306 – 34-bit Tracked format with customer defined facility code

Alternatively, for added security use the HID Corporate 1000 format.

If choosing a format for the incoming iCLASS cards, differing from the outgoing HID proximity cards; this introduces a more complex transition. During the migration period, the reader outputs different data structures depending on whether presenting an iCLASS or HID Prox Card at the reader. Reference the Access Control Panel technical specification to determine whether this is possible and how to manage within the cardholder database.



Indala Prox

Indala Prox operates differently when compared to HID Prox. For instance, there is a format assigned not only to the Credential but also to the reader. Therefore, the multiCLASS reader must have the same Indala format as the existing Indala Proximity readers.

Note: The reader and card format reference numbers for Indala do not necessarily match.

The method for transitioning from Indala Proximity to iCLASS is similar to HID Prox, except the Indala formats do not necessarily have a direct correspondence to an HID format. Therefore, it is necessary to work with Technical Support and if necessary, create a corresponding HID card format. Two open Indala formats do have a corresponding HID format.

Indala Card Format	HID Card Format	Description
40134	H10301	26-bit Wiegand Open
4010X	H10307	27-bit Wiegand Open

If choosing a format for the incoming iCLASS cards, differing from the outgoing Indala proximity cards, this introduces a more complex transition. This is simply because during the migration period, the reader outputs different data structures depending on presenting an iCLASS or Indala Prox card at the reader. Reference the Access Control Panel Technical Specification determining whether this is possible and how to manage within the cardholder database.

EM4102 Prox

Unlike HID Prox and Indala Prox, EM4102 credentials are not programmable and utilize a unique 32-bit number encoded into the credential – similar to MIFARE Classic CSN. Possibly, EM4102 suppliers may provide credentials with an additional 8-bit programmed with a Fixed Customer Number unique to the supplier, thereby creating a 40-bit number.

EM4102 readers commonly output 32-bit or 40-bit Wiegand (with or without parity added) or 10 characters clock-and-data

Furthermore, it is common for EM4102 readers to output 26-bit Wiegand, although not recommended, as the 32-bit number is a result contained in the credential being truncated (reader only outputs lower 24-bits of the unique number plus 2 parity-bits) creating a large risk of duplicate numbers.

Truncation Example

Bit	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	Dec Equivalent	
Cred 1	1	0	0	1	0	1	0	1	1	0	0	0	0	0	1	1	0	1	1	1	1	1	0	1	1	0	0	0	1	0	1	1	2508422539	
Cred 2	1	0	0	1	0	0	0	1	1	0	0	0	0	0	1	1	0	1	1	1	1	1	0	1	1	0	0	0	1	0	1	1	2441313675	
26-bit Truncated										1	0	0	0	0	0	1	1	0	1	1	1	1	1	0	1	1	0	0	0	1	0	1	1	8617355

In this example, Credential 1 and Credential 2 appear to the access control panel to contain the same number when utilizing only the first 24-bits of card number. In large card populations, the chances of card duplication become significant.



Choosing the Correct Format

With EM4102 credentials there is no format information included within the card number, therefore to configure the multiCLASS reader provide the required output. Specify EM4102 output modes available for the multiCLASS reader at order time by inserting a reference character in the Wiegand Output Mode position in the part number as described in the following table.

	Description	Wiegand Output Reference	iCLASS Credential Format Reference	Part Number Example (RP15 Reader)
Wiegand 26-bit	24 Data + 2 Parity*	K	H103012	6145CKE000K
Wiegand 32-bit	32 Data ,No Parity*	S	H103130	6145CKE000S
Wiegand 34-bit	32 Data + 2 Parity*	M	H103061A	6145CKE000M
Wiegand 40-bit	40 Data, No Parity*	N	H10314E	6145CKE000N
Wiegand 42-bit	40 Data + 2 Parity*	P	H10314F	6145CKE000P
Magstripe 10 Digits	32-bits card data reformatted to BCD (each character 5-bits) with leading zeros, Start Flag, End Flag, LRC and trailing zeros*	Q	H10314B	6145CKE000Q

*Refer to EM4102 the following Output Matrix for structure details and example.

For HID Prox and Indala Prox, the easiest method of transition is matching the incoming iCLASS card format utilized with the existing EM4102 readers. Match the reader format reference number with the incoming iCLASS credential number.

If choosing a format for the incoming iCLASS credentials differing from the outgoing EM4102 credentials, introduces a more complex transition. During the migration period, the reader outputs different data structures depending on presenting an iCLASS or EM4102 Prox credential to the reader. Reference the Access Control Panel Technical Specification; determine if this option is possible and how to manage it within the cardholder database.



EM4102 Output Matrix

The following table provides detailed information on the data structure for each of the output formats available for EM4102 Prox. Provided is an example card number and the resulting output using each output format. In addition, a configuration card reference number is provided for each of the reader output formats.

40-bit Raw Card Data	
0000861528	0000000000000000100001100001010100101000
26-bit Wiegand Configuration Card part number:- 2000-11-07-000003	
	EXXXXXXXXXXXXX
	XXXXXXXXXXXXX0
10C2A51	01000011000010101001010001
32-bit Wiegand Configuration Card part number:- 2000-11-07-000002	
00861528	00000000100001100001010100101000
34-bit Wiegand Configuration Card part number:- 2000-11-07-000013	
	EXXXXXXXXXXXXXXXXXX
	XXXXXXXXXXXXXXXXXX0
2010C2A50	1000000001000011000010101001010000
40-bit Wiegand Configuration Card part number:- 2000-11-07-000000	
0000861528	0000000000000000100001100001010100101000
42-bit Wiegand Configuration Card part number:- 2000-11-07-000012	
	EXXXXXXXXXXXXXXXXXXXXX
	XXXXXXXXXXXXXXXXXXXXX0
200010C2A50	100000000000000001000011000010101001010000
10 Digit Clock-and-Data Configuration Card part number:- 2000-11-07-000004 + 2000-11-00-000000	
(25) B0000861528F4 (120)	SS data data data data data data data data data data ES LRC 110100000100001000010000100010110110000101010100000010111100101 B 0 0 0 0 8 6 1 5 2 8 F 4